

ABSTRACT

A multi-wavelength optical signal copropagates through a fiber-optic communication link with a continuous-wave ancillary wavelength having an unknown state of polarization (SOP), which is scrambled periodically in time. The instantaneous value of polarization dependent loss (PDL) in the ancillary wavelength is monitored in real time, and is used as an error signal to adjust at least one polarization controller. Polarization scrambling is performed by periodically changing the SOP with time, such that the polarization-scrambled optical signal covers approximately an entire Poincaré sphere surface, preferably uniformly, during each time period. At an optical node between fibers, an adjustable PDL compensator contains two ordered pairs each consisting of one polarization controller and one optical element introducing fixed PDL.